

Kentucky Department of Education

Course Standards for 2019-2020 and Beyond

Course Code: 270203

Course Name: Grade 8 Mathematics

Grade Level: 8

Upon course completion students should be able to:



Standards

Standards for Mathematical Practice

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

8.NS The Number System

KY.8.NS.1

Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.

KY.8.NS.2

Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram and estimate the value of expressions.

8.EE Expressions and Equations

KY.8.EE.1

Know and apply the properties of integer exponents to generate equivalent numerical expressions.

- a. Work with radicals and integer exponents.

KY.8.EE.2

Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect

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squares and cube roots of small perfect cubes. Know that perfect squares and perfect cubes are rational.

KY.8.EE.3

Use numbers expressed in the form of a single digit times an integer power of 10 (Scientific Notation) to estimate very large or very small quantities and express how many times larger or smaller one is than the other.

KY.8.EE.4

Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology.

KY.8.EE.5

Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

KY.8.EE.6

Use similar triangles to explain why the slope, m , is the same between any two distinct points on a non-vertical line in the coordinate plane; know the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .

KY.8.EE.7

Solve linear equations in one variable.

- Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
- Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms.

KY.8.EE.8

Analyze and solve a system of two linear equations.

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- a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously; understand that a system of two linear equations may have one solution, no solution, or infinitely many solutions.
- b. Solve systems of two linear equations in two variables algebraically by using substitution where at least one equation contains at least one variable whose coefficient is 1 and by inspection for simple cases
- c. Solve real-world and mathematical problems leading to two linear equations in two variables.

8.F Functions

KY.8.F.1

Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

KY.8.F.2

Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

KY.8.F.3

Understand properties of linear functions.

- a. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line.
- b. Identify and give examples of functions that are not linear.

KY.8.F.4

Construct a function to model a linear relationship between two quantities.

- a. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph.
- b. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values.

KY.8.F.5

Use graphs to represent functions.

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- a. Describe qualitatively the functional relationship between two quantities by analyzing a graph.
- b. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

8.G Geometry

KY.8.G.1

Verify experimentally the properties of rotations, reflections and translations:

- Lines are congruent to lines.
- Line segments are congruent to line segments of the same length.
- Angles are congruent to angles of the same measure.
- Parallel lines are congruent to parallel lines

KY.8.G.2

Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections and translations. Given two congruent figures, describe a sequence that exhibits the congruence between them.

KY.8.G.3

Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.

KY.8.G.4

Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations and dilations. Given two similar two dimensional figures, describe a sequence that exhibits the similarity between them.

KY.8.G.5

Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal and the angle-angle criterion for similarity of triangles.

KY.8.G.6

Explain a proof of the Pythagorean Theorem and its converse.

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KY.8.G.7

Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

KY.8.G.8

Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

KY.8.G.9

Apply the formulas for the volumes and surface areas of cones, cylinders and spheres and use them to solve real-world and mathematical problems.

8.SP Statistics and Probability

KY.8.SP.1

Construct and interpret scatter plots for bivariate numerical data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association and nonlinear association.

KY.8.SP.2

Know that lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a line and informally assess the model fit by judging the closeness of the data points to the line.

KY.8.SP.3

Use the equation of a linear model to solve problems in the context of bivariate numerical data, interpreting the slope and intercept.